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AUTHOR Johansson, Britt
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ABSTRACT

An English summary of a study on nursing education which was written in Swedish is presented. Standards of medical and surgical knowledge required of student nurses were evaluated based on all written test items in medical and surgical nursing set during one year at Swedish schools of nursing. The views of teaching staff and student nurses on grading, educational measurement, and desired content in test items were also surveyed. As background to the study, the organizational and administrative limitations of education were considered along with the influence of changing views concerning evaluation. Nursing theories and the history of nursing were reviewed, and the education and evaluation program in the basic nursing course were described. Two nursing education research efforts, which concerned the nature of basic training in medical and surgical nursing, and patient-centered nursing and efficiency concepts were outlined. Data collection methods and classification systems for test items in the medical and surgical courses were identified. Three systems of classification for demands on information acquisition were developed: subject coverage, the health care process, and disciplinary origin. Requirements with respect to the complexity of information processing were analyzed. The classification system is based on the amount of facts the student has to handle in order to answer the questions and the type of reasoning required. Teachers' and students' opinions were surveyed in terms of the importance of grades to society, the procedure used when awarding grades, and the relevance of the tests. A bibliography is included. (SW)

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NEED OF KNOWLEDGE IN NURSING AND DEMAND FOR KNOWLEDGE IN NURSING EDUCATION

BRITT JOHANSSON

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DEPARTMENT OF EDUCATION, UNIVERSITY OF GÖTEBORG
BOX 1010, 431 26 GÖTEBORG, SWEDEN

This report continues the series of Reports from the Institute of Education, University of Göteborg, which started in 1962 and issued its 90th number in December, 1979.

On the cover the English name of Pedagogiska institutionen has been changed from Institute of Education to the more adequate translation Department of Education. The number consists of year and number within the year.

A list of reports nos. 1-90 is found in this issue.

Kjell Härnqvist

NEED OF KNOWLEDGE IN NURSING AND DEMAND FOR KNOWLEDGE IN NURSING EDUCATION

This report is a reprint of the summary from a dissertation written in Swedish.* The study presented in the dissertation is a part of a research project financed of the National Board of Education.

In the margins you will find references to the tables in the Swedish origin.

*The title of the dissertation is in Swedish:
Kunskapsbehov i omvårdnadsarbete och kunskapskrav i vårdutbildning.

The purpose of this study is to discuss what standards of medical and surgical knowledge are required of student nurses. As a basis for this discussion, I have analysed all written test-items in medical and surgical nursing set during one year at Swedish schools of nursing. In addition to this analysis, I also present the views of the teaching staff and student nurses on grading, educational measurement and the desired content in test-items.

When attempting to answer the question what kind of knowledge the instruction provides, I base my analysis on the conviction that the items are influenced by concepts of evaluation and nursing. This necessitates discussion of pedagogical evaluation theories and theories relating to nursing. As a background to the analysis of the test-items, I describe the organisational and administrative limitations of the education and how these and other frame factors influence the educational process.

Chapter 1 deals with the evaluation concept. During the last few decades pedagogical evaluation has acquired a new import as the community's and students' expectations of the school have changed. Originally mainly associated with examinations, evaluation is nowadays regarded as an instrument for checking and amending the school programme as well as the student's capacity and qualifications. In other words, evaluation has acquired a pedagogical function. The altered evaluation concept may, however, contain an inherent source of conflict as the community has developed several

value-systems concerning the purposes of the school. The school has to work with an economic-technological approach as well as a social one. The school aims to increase the pupil's understanding for other people, her ability to cooperate with others, her critical thinking, her ability to communicate with her fellows etc. These social goals are confronted with economic-technological requirements of maximum efficiency and optimal individual results in the shortest possible time. The different approaches result in different types of evaluation studies.

The evaluation studies in the school may follow different principles. The evaluation methods used in an examination or test differ from those used for the continuous evaluation process which is part of the actual teaching process. The teachers and the students evaluate one another and evaluate how well they work together and what results they achieve in collaboration with one another. In the latter type of evaluation, the pedagogical function is very prominent as the student receives immediate feed-back on her performance. According to Lundgren (1977), this results in both meta learning and instruction learning.

As a result of the changes in the concept-formation of evaluation, the students' roles have also changed. Students' expectations of being set a test with a pronounced pedagogical function have increased. The tests are now required to be part of the total educational process, not merely a follow-up of the contents of the course. The control instrument has thus also become an instrument for change.

In addition to being a means of control and change, the evaluation procedure gives rise to unforeseen effects on the students' study technique and on the educational process. The tests steer the learning process and may also steer the teaching process to some extent. The tests are the most concrete documentation of the school's aims and requirements we have (Marton and Säljö, 1976).

Grading is not the ultimate purpose of all evaluation. Evaluation is the process by which the teachers judge the students' achievements and grading is the process by which teachers assign symbols that represent the students' level of academic achievements. The grading process thus follows the evaluation process. Grading entails four critical methodological problems (Kvale, 1970). Three of them - norms, weighting and the standard scale - are inherent in all tests and the fourth is related to the examiner's training in evaluation and grading.

In Chapter 2 the education programme and evaluation programme in the basic nursing course are discussed. As the evaluational process and the educational process differ with respect to frame factors, content, methodology and, perhaps, results, I have distinguished between the evaluational process and the educational process in my theoretical model.

The definitions of the concepts frame factors and teaching process are taken from Dahllöf (Dahllöf and Lundgren, 1969; Lundgren 1972, 1977). My own definitions of evaluational frame factors, the evaluation

process, the results and the connection between the three concepts are identical with those for the teaching process. Frame factors limit and determine, to some extent, the process. Frame factors and the process together give the results. The reason for distinguishing between the teaching process and the evaluation process is that the results of combined theoretical and practical education, such as that given to student nurses, are probably more comprehensive than can be measured by tests in the theoretical courses. It is therefore important to consider the analysis of the test-items in the context of evaluational frame factors and the evaluation process.

The education provided by schools of nursing is influenced in many ways by nursing care and medical care in hospitals and the public health services. I have therefore chosen to consider nursing and nursing education as two mutually dependent open systems. The objectives for nursing education are set primarely by the schools themselves but also by doctors and nurses working in the field. A conflict of interests between the two groups sometimes arises. Professional interests from the field may then outweigh the school´s objectives as the students´ practical grades are usually awarded by nurses in the field. Uncertainty as to how to reconcile the conflicting interests of different pressure groups seems to be a problem common to students all over the world.

Evaluation of the student nurses´ knowledge and proficiency is performed in two ways. In the theoretical studies the evaluation is influenced by general pedagogical evaluation theories, while in the prac-

tical studies principles taken from professional life are applied.

All Swedish schools of nursing used the same curriculum during the years 1966 and 1977. The curriculum specified the aims and objectives for the different subjects and gave also directives and advice for tests and grading. It is therefore justified to speak of a common evaluational programme in all the schools. But the fact that the programme was so uniform is not just due to the curriculum, it is also the result of established tradition and the existence of a single teachers training college and a national registration system which also functions as a check on school programmes and the evaluation system.

Chapter 3 gives a brief historical review of nursing education. The forerunner of the modern system of nursing education did not appear until the nineteenth century. The basic characteristics of Swedish nursing education derive from three sources: Fliedner's protestant deaconesses' institutions, Florence Nightingale's work and school of nursing and the Red Cross movement. Florence Nightingale's influence is by far the most important of these factors.

The archetype of modern nursing education took shape during the period 1840 - 1900. Women's emancipation had started but Romanticism still flourished and loving care and service were the distinguishing qualities of the ideal woman. The community underwent major changes as the bonds uniting the extended family were loosened and the nuclear family became the natural unit. The health service was in need of reinforcement in the form of well-educated women,

and women needed the health service. In addition to the forces I have already mentioned, many other factors influenced the situation. Jamieson, Sewall and Suhrie (1968) list the following: religion, philanthropy, the human sciences, medicine, military science, feminism and the birth of socialism.

Nursing education in Sweden has its roots in the period 1860 - 1900. From that time onwards it was so well established and recognized that the state concentrated its efforts on regulating the education programmes and establishing a formal appointment system. The twentieth century has thus seen increasing intervention from society with several official reports from the Swedish government. The interventions have resulted in a stricter control of nursing education, and it is these activities that have shaped modern training as we know it.

As is the case for nursing education all over the world, knowledge in the field of nursing has grown up as a result of traditional practice. Martinsen (1974) distinguishes between traditional and professional practice. The characteristic feature of traditional practice is that it takes a holistic view of the patient, but it is not based on scientifically proven facts. Professional practice adopts a completely different approach as it is based on specialization and knowledge founded on firm scientific facts. The fact that nursing up to now has been based on tradition is related to the organisation of nursing education and the lack of research.

Chapter 4 deals with nursing theories. The lack of a theoretical basis for nursing and the possibilities of creating one form the starting point for an analysis of philosophical/normative theories on three aspects:

1) The content of nursing
2) Nursing in relation to the health/disease concept
3) Nursing in relation to philosophical conceptions concerning mankind and human nature.

The content of patient care may be illustrated by a number of well-known statements, such as the ethical rules for nurses, the WHO's definition of nursing and Lesnik's and Anderson's (1955) dependent and independent functions in nursing. Since 1970 a number of authors have described nursing as a process in which the nurse's intellectual activity forms the mainspring (Yura and Walsh, 1973; Bevis, 1973). Other authors consider the essential point in nursing to be the interaction between the nurse and the patient and assign a problem-solving role to the nurse (Abdellah, 1965, 1973; Roy, 1975).

The health/disease concept has been regarded as an entity ever since Florence Nightingale defined nursing as "putting the patient in the best condition for nature to act upon him". From that time onwards, active promotion of health has been one of the functions of nursing. But the health concept has many dimensions, depending on whether it is seen from a biological, psychological or sociological point of view. Finally, health can also be viewed in a political context. But, as Lambertson (1958) points out:

"Nursing is a dynamic therapeutic and educative process in meeting the health needs of society."

Irrespective of which science the health concept is considered to belong to, it is usually given a normative content in the nursing context, i.e. the function of nursing is to maintain or promote health.

My description of nursing and philosophical conceptions of man and human nature has been divided into four aspects:

1) Treatment of the sick person or the disease
2) Conceptions of human nature
3) The nurse's conception of her role
4) The nurse's professional competence

"Credit for initiating the modern concept of disease goes to Thomas Sydenham (1624-1689), who first described gout and differentiated scarlet fever from measles" (Shontz, 1975, p. 20). During recent years a number of Swedish authors have argued against this concept and advocated a more holistic approach to nursing. Basically, this implies a broadening of the concept rather than its replacement by a new approach.

Reilly (1975) considers conceptions of human nature to be the decisive factor for setting directional norms in nursing. In this study I have therefore discussed the effects of three different attitudes in terms of man as basically good, basically bad or both at the same time, the influence of a behaviouristic as opposed to a phenomenological approach, and the effects of regarding the body and soul as separate entities or as integral parts of a whole.

The Swedish curriculum does not specify upon which conception of man the objectives are based. The objectives merely define which functions the education is intended to cover. It is therefore possible that the course is based on different conceptions of man in different schools.

A number of studies have shown that the nurse's conception of her role is unclear. This is partly due to the fact that the nurse's total role complex includes certain disparate roles. Furthermore, these roles are constantly changing, so that a role which was previously not particularly prominent suddenly acquires dominant importance.

Professional competence can be considered from three aspects:

benefit to society,

benefit to society and importance to the person practising the profession,

importance to the person practising the profession.

The benefit to the society has been given priority in the Swedish curricula since the nineteen-sixties. The American literature on nursing includes examples of the other two approaches. The literature dealing with professionalism is particularly interesting in this context.

As a basis for obtaining more knowledge about nursing, a number of authors have suggested how various theories from the social and behavioural sciences might be applied (Riehl and Roy, 1974; Bevis, 1973; Murphy, 1971; Yura and Walsh, 1973). But a look at the research which has actually been carried out quickly

reveals that this aspect has generally been completely ignored. Instead, research into nursing has mainly been focused on specific problems and details of the subject.

Research into nursing aims at creating a basis for nursing education. American authors have confirmed that research has in fact had an impact on curricula.

In Chapter 5 I present my own research programme in the field of nursing education. It comprises two projects. The main aim of one of them is to analyse, describe and explain the education in medical and surgical nursing included in the basic training education for nurses. Medical and surgical nursing are taught in two phases of the course: during the first term of practical training and during the final term of the course. The other project, which is intimately related to the first one, is a study of patient-centered nursing and efficiency concepts and their impact on the clinical training.

Both my research projects employ the same model, i.e. the conceptions of nursing and education, together with the frames set up, form the background to studies of education and evaluation. When studying the frames, the educational process, the evaluational process and results, we are interested in both the contents and the methodology in educational and evaluational process.

This study mainly deals with conceptions of the contents of nursing education, the contents and function of the evaluation procedure and the knowledge demanded in tests in medical and surgical nursing.

In Chapter 6 I describe the method of collection of data and the systems used for classifying test items.

Each item in the tests in the medical and surgical courses set during one year at Swedish schools of nursing has been classified according to five separate systems of classification. The purpose of this classification has been to analyse technical aspects of the items as well as the demands on students' acquisition and processing of information.

The analysis concentrates solely on the process part of the evaluation system as I have only studied the items, not the answers. I can therefore only draw conclusions about the knowledge demanded of the students; the study gives no information about how well the students met the requirements. It is important to analyse the process part since it shows what the schools really demand of the students. Having identified the requirements, the consequences for the students and for attitudes in the health service can be discussed.

I have based my analysis of technical aspects of the items on recognition and reproduction of knowledge because these two types of items require different study techniques. When preparing for a test which can be expected to contain questions of a certain type, the student tends to study certain aspects of the subjects and neglect others. Manuals on educational measurement contain detailed descriptions of technical aspects of the items, i.e. types of items. The types of items described in these manuals form the categories in one of my systems of classification.

Three systems of classification for demands on information acquisition were developed: subject coverage, the health care process, and disciplinary origin.

When developing the analytical systems I aimed at systems which would be equally sensitive in both second and fifth terms and in both medical and surgical nursing and which would allow comparison with the planned instruction as described in the syllabus and in the preparatory work on which it was based. The basis for classification of subject coverage and the health care process has been taken from the text in the curriculum. Subject coverage consists of separate parts of the subjects mentioned in the curriculum, and the health care process (etiology, diagnosis, therapy etc) is mentioned as the desirable content when teaching the different parts of the subjects.

I have not had any prototype of classification of disciplinary origin. The system of classification is intended to reveal the proportion of underlying basic medical subject matter in relation to pathology and nursing, the proportion of nursing techniques in relation to other contents, and the proportion of natural sciences as biology in relation to sociology and psychology. All these aspects could be combined into a classification system since they represent independent and exclusive categories.

I have analysed the requirements with respect to information processing on a scale ranging from knowledge of terminology to items which necessitate consideration of extensive factual information derived from different parts of the course literature.

This classification system is based on models proposed by Bloom (1956) and Gagné (1967), and also on Charvat's, McGuire's and Parsons' (1968) modification of taxonomic principles for application in medical subject matter. My contribution is that I have based my analysis solely on the subject structure of the items and the ability to process information the subject structure presupposes.

In Chapter 7 I present the results of the classification of the technical aspects of the items. Several types of questions were usually used in the school but a few dominated the picture. Half of all items required a written answer in a few words (short-answer questions) and 27 % were multiple-choice items with only one correct alternative. The picture was fairly uniform in both terms and in both subjects. Both recognition and reproduction items occurred in almost all schools. Several different types of items were often included in the same test. This means that the test did not generally favour a certain study technique. Items requiring lengthy, descriptive answers were uncommon, however. Tables 2-4

In Chapter 8 I present the classification of the subject coverage, as described in the curriculum, as reflected in teaching time used in the schools and as distributed over test-items. Tables 5-9

Fourty separate categories have been combined into six main groups. The first of these - diseases in organs and organ systems - is by far the largest, irrespective of the subject and the term. It is always larger in medical than in surgical nursing,

however. In addition to the first group, surgical nursing is frequently represented in the three groups general rules and principles of treatment, physiological conditions requiring attention or treatment in connection with disease and accidents, operation and trauma. The main emphasis in medical nursing is placed on diseases of the thoracic organs, while in surgical nursing the main emphasis is placed on diseases of the abdominal organs.

The directives in the curriculum are implemented very faithfully in the instruction. The magnitude of the separate parts of the subject in terms of time devoted to them in the course is also often closely correlated to the proportion of items on that part of the subject. The test-items thus cover the education given in each part of the subject relatively well. The tests also contain certain items on topics which are not included in the syllabus as separate subject parts of the course. The tests set in the final term often contain items dealt with in term 2 but items on points not included in the curriculum as a separate subject heading in any term are also included. This forces the student to keep to the teaching structure.

In Chapter 9 I have analysed the health care process by classifying the items under the following headings: Tables 10-14

- Etiology
- Diagnosis/symptoms
- Investigations
- Therapy
- Rehabilitation
- Complications
- Prognosis
- Prophylaxis
- Aspects not included in the health care process

The two categories diagnosis/symptoms and therapy are larger than the others. Together, these two categories account for two-thirds of the number of information units in the items. (As some items have a content covering more than one categori, I have used information units instead of items.) No less than 10 % of the information units represents a content not included in the health care process. As 12 % concerns investigations and 8 % etiology, four categories share a small proportion of the total number of information units. Of these four categories, complications is largest, accounting for 5 % of the information units. Rehabilitation, prognosis and prophylaxis each account for 1 % or less of the information units.

The pattern shows that the instruction is mainly designed to prepare the student for hospital nursing and this emphasis is particularly pronounced in the final term. It is therefore debatable whether the education programme is in line with the plans for the health service in the future, with increased emphasis on ambulant care and preventive treatment. It is also debatable whether the nurse receives sufficient education in "assisting with health education", which is one of the main aims of the curriculum.

A comparison between the physicians' lectures on pathology and the clinial teachers' lectures on nursing shows that two-thirds of the information units in medical pathology are devoted to etiology and diagnosis/symptoms, whereas 68 % of the information units in medical nursing are devoted to

therapy and investigations. In surgical nursing, 50 % of the information units in pathology are devoted to etiology and diagnosis/symptoms and 66 % of the information in nursing to therapy and investigations. The questions thus reflect the physician's and the nurse's roles in the health service.

In Chapter 10 I compare subject coverage and the health care process. Since subject coverage is a measure of the breadth of the education and since the health care process reflects the disposition of the topics taught, the comparison shows where the emphasis is placed in the different topics. Tables 15-17

As a rule, the main topics are represented right across the health care process. There are certain exceptions, however: complications account for no less than 20 % of the information units for the endocrine organs.

Generally, the different categories in the health care process are also well spread over the different topics. This is a direct reflection of the influence of the requirements for institutional nursing once again. Although the rare categories prognosis, prophylaxis and rehabilitation are spread over a large number of topics, the weaknesses from the analysis of the individual classification systems remain. There are so few items in these rare categories that the student does not need to prepare for a test which includes these items. The great diversity of topics accentuates this.

In Chapter 11 I discuss the disciplinary origin of the items. In addition to the proportion of patho- Tables 18-22

logy and nursing, this system of classification reveals the proportion of underlying basic medical and biological subject matter, the proportion of aspects derived from the behavioural sciences and the proportion of nursing techniques. Ten categories corresponding to the requirements were formulated. The basic medical subjects are as follows:

Anatomy/physiology
Pharmacology
Microbiology and hygiene
Clinical chemistry
Social medicine

The behavioural sciences are represented by two categories:

Psychological aspects
Sociological aspects

The other requirements - pathology and nursing, and nursing techniques - can be treated as separate categories. There is also one more category - miscellaneous - with only markings divided between nursing supervision medical statutes and history of medicine.

Certain items cover more than one category. The number of information units in the items has therefore been classified instead of the number of items.

Pathology and nursing is by far the largest category, irrespective of the subject or the term. This category accounts for 66 % of all information units in medical nursing and 73 % of all information units in surgical nursing. Of the basic medical subjects, anatomy/physiology and pharmacology are the largest, accounting for 9 % of the total number of information units each. Clinical chemistry accounts for 7 % altogether. For this subject there is a peak in me-

dical nursing in term 5 (11 %). Biology and other natural sciences therefore dominate very markedly over the behavioural sciences. Only 54 out of 20,624 information units require knowledge derived from the behavioural sciences. The items on details of nursing techniques are fairly evenly spread over the terms and subjects and account for 4 % of the information units on average.

All the schools used items on pathology and nursing, nursing techniques and the basic medical subjects (except microbiology/hygiene and social medicine). This may be compared with items on aspects relating to the behavioural sciences. 10 schools had questions on psychological aspects and 10 on social aspects in term 2, and 8 schools had questions on social aspects and 3 on psychological aspects in term 5. If the education in term 2 is divided into pathology and nursing, topics derived from the behavioural sciences were only dealt with in connection with nursing.

Although topics relating to the behavioural sciences are included in the curriculum as separate subjects, it might be argued that far too little emphasis is placed on these aspects of medical and surgical nursing in the tests.

In other respects, the proportion of nursing techniques in relation to other subjects seems to be reasonably consistent with the aims of the course. The finding that the proportion of nursing techniques in the final term is the same as in the second term should be considered in the light of the fact that nursing techniques comprise both simple and difficult techniques. This

makes it logical to include teaching in nursing techniques throughout the education programme.

The proportion of pathology and nursing, and the proportions of certain other categories, vary greatly from school to school. Certain schools only devote 50 % of the information units to pathology and nursing, while others devote 87 % of the information units to this category. The schools therefore have different item profiles. The influence of, above all, basic medical subject matter and nursing techniques therefore differs between the schools, with consequent differences in structure of the medical and surgical nursing.

Chapter 12 deals with requirements with respect to the complexity of information processing. The classification system is based on the amount of facts the student has to handle in order to be able to answer the questions, and the type of reasoning required. The higher up in the system the question is classified, the more complex and difficult it is. Eight different categories were formulated using these principles: Tables 23-27

Terminology

Definitions

Combination of terminology and definitions

Functional information

Analysis and comparison

Problem-solving

Functional information together with clinical experience

Evaluation of a situation and proposal of a solution

All these categories, with the possible exception of the last one, can be dealt with by means of conventional answers, i.e. the answers are available in the course literature or can be deduced from principles and rules learned in the school or during nursing practice.

Functional information was by far the most common category, accounting for 73 % of the questions. Allocation of a question to this category means that the answers were based on information obtained directly from the course material in preparation for the test. The next most common categories of items were terminological items and items involving analysis and comparison, each of which accounted for 8 % of the questions. Terminological questions were unevenly distributed over the subjects and terms, however. 12 % of the items in the surgical nursing paper in term 2 were terminological items. Items entailing problem-solving accounted for 5 % of the total material and were evenly distributed over the subjects and terms. Definitions, combination of terminology and definitions and functional information together with clinical experience each accounted for 2 % of the questions. By far the least common category was items requiring evaluation of a situation and proposal of a solution. Only 18 out of 17,109 items were of this type. This means that the category did not account for 1 % of the items in any subject in any term, taking all the schools together.

As in the previous classification system, the different categories were used with different frequency in the different schools. The proportion of items containing functional information in term 5, for example, varied

between 37 % and 89 %. The different schools thus had different item profiles and also demand different types of reasoning from their students.

There were also great differences between the schools' item profiles in term 2. The proportion of items on functional information varied between 43 and 86 %. The use of the first three categories is very interesting. Terminological items accounted for up to 34 % of the total, definition items up to 7 % and combined terminological and definition items up to 30 %.

Items involving analysis and comparison accounted for between 2 and 20 % of the total, items entailing problem-solving between 1 and 9 % and questions requiring functional information together with clinical experience between 0 and 2 %.

Items involving evaluation of a situation and proposal of a solution were included in the tests at only 2 schools and did not account for 1 % of the total in either.

Although it is important to learn the terminology used in the different medical specialties, terminological and definition items seem to occupy too prominent a place in the tests.

The number of difficult items increased in the final term but the profile seems not to be optimal, unless the students' ability to use their knowledge is tested in other ways, preferably during the clinical training. The time allowed to answer the test-items is limited and complicated items may be difficult to penetrate and answer under these conditions. The

spot-check nature of the present test-items would also be lost if the tests contained a few essay items instead of a large number of items from all the parts of the course. In view of the consequences for the health service, it is desirable to evaluate the results from the education with techniques which place varying demands on information acquisition and information processing so the true kind of knowledge will be analysed. It is not self-evident, however, that the demands should be put into practice in theoretical tests. Inclusion of difficult information processing activities in the clinical training might, in the long run, teach the student to adopt the same active approach to tackling nursing problems in her later professional life.

In Chapter 13 I analyse the position of items entailing problem-solving in the different classification systems because these items require complex reasoning and relate to problems in professional life. Tables 28-31

Items entailing problem-solving occur in all the categories of technical aspects of the items. As a rule, the categories which contain many items also contain many items involving problem-solving. In medical nursing 95 % of these items were short-answer questions or multiple-choice items with one correct alternative. In surgical nursing those two categories accounted for 90 % of the items in term 2 and 81 % in term 5.

If problem-solving items are separated from the total subject coverage classification system, we find that the proportion of items with more than one information unit is higher than in the basic material. Part of

the complexity of the items is therefore due to the increase in the number of information units.

The proportions of problem-solving items in the different main groups of subject coverage are about the same as in the basic material. Within the different groups, however, the magnitude of the different topics may differ from that in the basic material. For example, items on the cardiovascular system, central nervous system and respiratory system account for a higher proportion of items entailing problem-solving than in the basic material (30 % compared to 21 %). For the gastrointestinal tract, kidneys and urinary tract, endocrine organs and liver and bile ducts, on the other hand, the proportion is lower (22 % compared to 31 %). For the abdominal organs, the items entailing problem-solving deal instead with general rules and treatment principles in various diseases (17 % of the problem-solving items compared to 12 % of the basic material).

The surgical nursing items span a considerably wider range of subject-parts than the medical nursing items, both in the problem-solving items and in the basic material. Items entailing problem-solving in relation to the health care process occur with the same frequency as in the basic material, calculated in terms of the sum of information units. The proportions of the different categories in the basic material compared with only the problem-solving items vary, however. The largest categories in the basic material are even larger

in the context of problem-solving items only. This means that the most difficult items usually concern therapy and diagnosis/symptoms.

No fewer than 91 % of the items entailing problem-solving belong to these two categories, compared to 63 % in the basic material. Items entailing problem-solving on other categories of the health care process are therefore rather uncommon. This results in a very distinct pattern. Items entailing problem-solving are asked on diagnosis and therapy and this is likely to influence the students' as well as the professional's conceptions of advanced nursing.

There is no difference in the number of information units from the basic material with respect to disciplinary origin either. Pathology and nursing is a larger category when only problem-solving items are considered (81 % compared to 69 % in the basic material). This influences the proportions of the categories connected with basic medical subject matter. The proportions of items on pharmacology and clinical chemistry are only half as great as in the basic material, while the proportions of items on anatomy, physiology, microbiology and hygiene, and social medicine are the same as in the basic material. The nursing techniques category is of equal size when only the problem-solving items are considered as in the basic material.

The categories relating to behavioural sciences are so small in both materials that it is not possible to compare the two. Almost half of the items with psychological content are problem-solving items, however. There may thus be a tendency for questions

entailing problem-solving to have a psychological context.

Chapter 14 presents the teachers' and the students' opinions on evaluation, measurement and grading. Three separate aspects are discussed:

The importance of grades to society
The procedure when awarding grades
The relevance of the tests

The majority of the teachers and most of the students regard the grades as a guarantee of the individual's professional competence. Neither teachers nor students are prepared to accept the grade system as a method of selecting people for further education or for professional appointments, however. Nor do they accept grades as a motivation factor in school life (Johansson, 1978 c).

That theoretical grades are considered important is shown by the fact that all the students studied intensively before the tests (Johansson, 1978 d).

In order to obtain teachers' and students' views on grading and tests, I have used a questionnaire, which has been described in detail elsewhere (Johansson, 1978 a). The results showed that most of the respondents thought grades should be awarded according to predetermined norms on a two-point scale: pass or fail (Johansson, 1978 b). They were generally not prepared to accept an extended grade scale and they rejected norm-referenced grading. Tables 32-34

To obtain information on teachers' and students' views on the contents of test items, they were asked, in the questionnaire, to state their opinions on the

different categories in the classification system of information processing. One-third or more of the teachers and students accepted the last five categories as being important (from functional information through evaluation of a situation with proposal of a solution). Items entailing problem-solving were considered to be by far the most important type. When the teachers and students were asked to describe what kind of items they thought were most frequently used in the tests set during the period, however, 50 % or more of the teachers indicated the first four categories, i.e. from terminological items to functional information.

The teachers and students were also asked to give their opinions on the present pattern of items. 43 % of the students were satisfied or fairly satisfied with the tests, compared to 21 % of the teachers. 36 % of the students stated, however, that the tests were unsatisfactory, compared to 27 % of the teachers. Those who were dissatisfied wanted more items from the three most difficult categories. The main reason stated was that these categories are pertinent to working life and foster independent, critical thinking. 19 % of the students and 17 % of the teachers considered, however, that all the categories should be included in the tests as they would otherwise be less relevant to professional life.

In Chapter 15 I comment on the results presented. I will only mention a few points from this rather long discussion here.

It is important to analyse tests in the way I have done as otherwise it will be impossible to get a true picture of the concept-formation in education and in nursing. It will also be difficult to estimate, for example, the proportion of biological content in relation to items derived from the behavioural sciences.

It is also important to analyse the contents of all parts of the education as otherwise the conceptions it results in will only be known for certain parts, e.g. medical and surgical nursing, as in this study.

The systems of classification are constructed in such a way as to enable an expert in a certain subject to use them without difficulty and apply the basic concepts for construction of classification systems for other medical specialities. This is also important. Teachers should be able to make use of this work as a basis for development in their own particular fields.

The tests are also an expression of the evaluation concepts in education and in the health service. This means that the evaluation in itself has an influence on what knowledge is considered necessary in different branches of the health service. Evaluation leads to certain attitudes towards knowledge and influences the decision as to what should be taught, how the acquired knowledge should be used and what measures should be taken to keep abreast of developments. Seen from this point of view, it is surprising that the evaluation system, which has been allowed to develop in complete freedom, is as efficient as it in fact is. The analysis of the

test-items has revealed a number of positive findings. The subject coverage is good. The proportion of items on the various parts of the subjects correlated well with the teaching time devoted to each part. The diseases are generally treated comprehensively. The subject matter which is recommended for integration in the curriculum is generally treated that way. The general pattern of items does not favour any particular study technique, and so on.

But there are also a number of negative points. The tests cover a wide range of topics, which may make it difficult for the student to recognize a broad theme and makes it important to study details. The great majority of items concern details from the course literature and require the student to recognize or reproduce limited amounts of information. The teaching in pathology and nursing places too much emphasis on the biological aspect. Although a health service not firmly founded on a sound knowledge of the natural sciences is unthinkable, we must extend our horizons if we are to avoid becoming prisoners in a system of increasing technocratic efficiency and organ fixation. The sick patient also needs human kindness, contact and warmth. The health care process has also become too preoccupied with the problems of institutional care. In order to be able to provide more comprehensive care in the ambulant health service, we need to place more emphasis on prevention and self-treatment.

Whether or not the curriculum perpetuates these weaknesses is another interesting question but this

study does not permit conclusions other than in terms of a general discussion. The curriculum is the result of extensive committee work. The present-day health service also has a strong influence on the education. If there are weaknesses in the test system which can be attributed to basic features of the curriculum, which is in turn founded on the community's (or its representatives') attitudes towards medical and nursing care, then what is sick (sickest): the community, the health service, the curricula or the test-items?

It is important that this analysis of the examination questions is considered in the context of a logical evaluation system. Such a system is lacking in Swedish education today. The system is needed in order to be able to judge the most suitable technical structure of test-items and which information acquisition and information processing ability should be tested for in theoretical tests in order to achieve optimal pedagogical results. The tests should also give a true picture of the school's actual results and demonstrate how well the official curriculum coincides with the school's objectives as documented by the test-items.

To underestimate the influence of the test-items on the profession's conceptions of nursing is probably dangerous. The analysis of the contents of the test-items and the importance teachers and students attach to the test procedure shows that the teachers and students may be expected to have an influence on the following points:

Conceptions of how knowledge in the art and science of nursing should be increased and maintained in relation to traditional, professional and critical practice.

Conceptions of the nature of nursing and the nurse's role in the development of nursing.

Conceptions of how views concerning mankind and human nature influence the nurse's relations with her patients and the nature of her work.

It is therefore extremely important to analyse, and endeavour to improve, the evaluation process.

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